

**BIOLOGICAL ASSESSMENT FOR FEDERAL SPECIES
IN THE MIDDLE RIVER PROJECT AREA
U.S.D.A. FOREST SERVICE
MARK TWAIN NATIONAL FOREST
HOUSTON/ROLLA/CEDAR CREEK RANGER
DISTRICT
CALLAWAY COUNTY MISSOURI**

INTRODUCTION

The purpose of this Biological Assessment is to identify the site-specific effects of the proposed action on federal threatened, endangered and proposed species under the Endangered Species Act (ESA). This Biological Assessment (BA) is done to ensure that federally funded actions do not jeopardize listed species or destroy or adversely modify their critical habitat (50CFR 402.12). This BA also utilizes the various species-specific information contained in the September 1998 Mark Twain National Forest Programmatic Biological Assessment (MTNF BA). This BA also documents compliance with the Terms and Conditions of the June 23, 1999 Biological Opinion (BO) on the Impacts of Forest Management and Other Activities to the Gray bat, Bald eagle, Indiana bat on the Mark Twain National Forest.

AREA AFFECTED

Project Location: The Middle River Project Area lies within the 43,374 Acre Middle River (10300102240002) watershed. The Middle River Project Area contains 1,296 acres of Forest Service System lands. It is characterized by broad flat ridge tops, gently rolling topography and some steep bluffs overlooking Middle River itself. It predominately contains hardwoods and numerous openings.

The project is located in Township 46 North, Range 10 West sections 13, 15, 24, 25 and 36, Fifth Principle Meridian in Callaway County Missouri. It is located approximately 5 air miles Southwest of Fulton Missouri.

Management Areas: 3.4.

Project Area Size: 1,296 acres.

LTA's in Project Area: Middle River Breaks portion of the Oak Hickory Hills LTA (HO).

Latitude/Longitude: 38 degrees 45' 57" North and 92 degrees 00' 50" West.

U.S. Geological Survey Quadrangle (Topographic) Map(s): Fulton, Guthrie, Mokane West and New Bloomfield.

PROPOSED ACTION

The preferred alternative is alternative two. The following management actions are listed in the Middle River Environmental Assessment and are given with approximate measures. This alternative would implement land management activities that are consistent with direction in the Mark Twain Land and Resource Management Plan (Forest Plan) and respond to specific needs identified in the Project Area.

A. Wildlife Habitat Enhancement Actions:

1. Reduce Open/Semi-Open Habitat.

Proposed Action A1a: Maintain existing open/semi-open habitat and native ecosystems on 400 acres. These 400 acres would move the area towards the DFC of 10-20 % range outlined in the LRMP. This would be accomplished through prescribed burning and/or grazing, and mechanical treatments in both warm season and cool season grasses. Seeding and fertilizing to maintain these open grazed areas would also continue as needed.

Proposed Action A1b: Plant hardwoods on approximately 45 acres of openlands and reduce prescribed burning on an additional 30 acres of open/semi-open lands to allow these areas to grow into forested habitat. This proposal would reduce the present amount of open/semi-open habitat and move the project area towards the desired future condition.

Provide Woodland Habitat in Old Growth Conditions.

Proposed Action A2: To move this habitat towards the DFC for the project area the proposal is to designate an additional 107 acres of old growth in the Middle River project area. These additional acres with those already designated (83 acres) include a variety of forest types, and block sizes to provide diversity of old growth forest conditions now and in the future. These proposed acres would place the area in the 10-15% range outlined in the LRMP and meet minimum viability.

3. Provide 40-50 percent of the sawtimber component of the Woodland Habitat in Oak, Oak-Pine, and Pine exhibits a condition of 20-30 percent forbs, grass and shrub ground cover.

Proposed Action A3a: To move this habitat towards the DFC for the project area, the proposal is to create approximately 460 acres of 20% to 30% ground cover with forbs, grasses, and shrubs habitat. This would be accomplished with the uneven-aged management technique of individual and group selection harvest in both hardwood and cedar stands. These acres would result in 36% of the Middle River Project Area in the 20 to 30% ground cover by forbs, grasses, and shrubs habitat condition.

Proposed Action A3b: Prescribed burning within 250 acres of woodlands will also contribute to this habitat type.

4. Provide Woodland Habitat in the 0-9 Year Age Class.

Proposed Action A4: To move this habitat towards the DFC for the project area, the proposal is to create 69 acres (15% of the area treated through group selection harvest) of 0-9 age class habitat. This would place the area in the 6% range and meeting minimum viability and moving towards the DFC of 8-15%. (See Action A3a)

5. Provide Diverse Amphibian Habitat.

Proposed Action A5: To help move this habitat toward the DFC and improve amphibian habitat, the proposal is to breach and lower one pond in the project area.

Watershed Health Actions:

1. Fencing to Exclude Livestock.

Proposed Action B1: Currently livestock have access to several wooded areas. Restrict livestock from steeper eroded areas and drainages with fencing.

2. Pond Reconstruction.

Proposed Action B2: Presently one pond is accessible to livestock and therefore does not provide a quality watering source for either cattle or wildlife. Reconstruct this pond in the project area, which would include associated fencing and a cattle watering tank.

3. Reconstruct existing forest road.

Proposed Action B3: Reconstruct Forest Road 1686 (0.9 mile) to improve the present drainage crossing and reduce soil movement. The original scoped proposal stated 0.4 mile, but the actual length of the road is 0.9 mile.

4. Improve Pasture Access.

Proposed Action B4: Improve access through the pastures and protect the soil resources with spot gravel in low or muddy areas in 4 locations

5. Road Closure.

Proposed Action B5: Close approximately 0.4 miles of non-system roads through the use of boulders and/or gates.

6. Planting/watershed control structure.

Proposed Action B6: Reduce soil movement at three wooded draws by planting and/or seeding native vegetation or installing a watershed control structure.

7. Well Closure.

Proposed Action B7: Close 2 existing open wells to improve safety to area users and protect soil resources.

8. Pond Maintenance.

Proposed Action B8: Maintain existing ponds as needed with methods such as mowing pond banks to control vegetation, fencing, or replacement of livestock watering tanks.

C: Recreation Management Needs

1. Improve parking lots.

Proposed Action C1: Improve five parking lots with gravel.

2. Interpretive signing

Proposed Action C2: Construct interpretive signs for the cultural history.

3. Self closing gate

Proposed Action C3: Improve dispersed access for fishing by installing a self-closing gate.

D: Associated or Connected Actions

Proposed Action D1. Some prescribed burn areas may need fireline construction. Natural firebreaks will be utilized wherever necessary. Construct approximately 1 mile of mechanical firelines.

Proposed Action D2. Reduce the spread and infestation of non-native invasive and noxious weeds such as multi-flora rose and/or sericea lespedeza (*Lespedeza cuneata*). Spot treat individual invasive plants with herbicide on 59 acres. *(Note: the individual plants would be treated by hand application only. Aerial and/or tractor boom application would not be utilized)*

Proposed Action D3. Improve hardwood seedling survival. Where hardwood plantings are proposed (See Proposed Action A1b), there is a need to improve seedling survival. Previous hardwood plantings into grasses such as fescue have greatly reduced survival and growth of planted trees. Spot treat seedling planting sites with herbicide within 45 acres to improve survival. *(Note: individual planting sites would be treated by hand application only.)*

CONSULTATION HISTORY

In 1984, the Forest Service requested formal consultation with the US Fish and Wildlife Service (FWS) on the Mark Twain National Forest Land and Resource Management Plan (Forest Plan). On August 8, 1985 FWS issued a non-jeopardy

biological opinion for seven federal species. In 1998, the Forest Service reinitiated programmatic consultation for continued implementation of the Forest Plan. Further consultation was needed to incorporate information gathered about federally threatened and endangered species over the past decade. The Mark Twain National Forest prepared a programmatic Biological Assessment (MTNF BA) that included the following federal species: bald eagle (*Haliaeetus leucocephalus*), gray bat (*Myotis grisescens*), Indiana bat (*Myotis sodalis*), Mead's milkweed (*Asclepias meadii*), running buffalo clover (*Trifolium stoloniferum*), Tumbling Creek cavesnail (*Antrobia culveri*) a current candidate species at that time, Topeka shiner (*Notropis topeka*), Curtis pearly mussel (*Epioblasma curtisi*), pink mucket pearly mussel (*Lampsilis abrupta*), Hall's bulrush (*Schoenoplectus hallii*) a current candidate species was submitted to FWS in September 1998. *Note: The Hall's bulrush also is a Regional Forester Sensitive Species (RFSS). Information can be found in the RFSS Biological Evaluation.*

Determinations of no effect or not likely to adversely affect were made for six of the ten species including Running buffalo clover, Tumbling Creek cave snail, Topeka shiner, Curtis pearly mussel, Pink mucket pearly mussel, Hall's bulrush. These determinations were concurred with by FWS during informal consultation. On June 23, 1999 FWS issued a non-jeopardy Biological Opinion (BO) for Bald eagle, Gray bat, Indiana bat and Mead's milkweed.

On August 18 and September 12, 2003 Klaus Leidenfrost discussed the proposed Middle River Project with Theresa Davidson (FWS). The species discussed include the Bald eagle, Gray bat, Indiana bat, Topeka shiner and Running Buffalo clover.

CRITICAL HABITAT

There is no designated critical habitat on the Mark Twain National Forest for any Federal threatened and endangered Species.

SPECIES CONSIDERED

The July 31, 2002 species list from the U.S. Fish and Wildlife Service was utilized for the preparation of this Biological Evaluation. It includes the Gray bat, Indiana bat, Bald Eagle, Topeka shiner, Curtis pearly mussel, Pink mucket pearly mussel, Scale shell mussel, Hine's emerald dragonfly, Running buffalo clover, Tumbling Creek Cavesnail and the Mead's milkweed.

The Curtis pearly mussel, Pink mucket pearly mussel, Hine's emerald dragonfly, Scaleshell mussel, Mead's milkweed and Tumbling Creek cave snail do not exist in or have potential habitat on Cedar Creek portion of Houston/Rolla/Cedar Creek Ranger District or in the Middle River Project Area.

Curtis' pearly mussel (*Epioblasma florentia*): This mussel occurs on river bottoms consisting of various materials from sand to boulders. However, this species needs flowing water for spawning. Middle River drains into the Missouri River. This species is found in the Black and Current River systems that drain into the Mississippi River downstream from its junction with the Missouri River

Pink mucket pearly mussel (*Lampsilis abrupta*): This mussel occurs on unconsolidated bottoms consisting of mud and/or sand and/or gravel. However, this species needs flowing water for spawning. It lives in sixth and seventh order streams (which are larger than Middle River). Historically, this species occurred in the Gasconade River system, but it is now extirpated from that system. It is found in areas with a low to moderate turbidity. The Zebra mussel is also impacting this species.

Scaleshell mussel (*Leptodea leptodon*): This relatively small mussel is often found in riffles in clear unpolluted water with a good current and is very susceptible to high sediment levels and other forms of water pollution. This species is known to occur in the Gasconade River system. The Middle River Project Area does not drain into the Gasconade River system.

Hine's emerald dragonfly (*Somatachlora hineana*): Is found in fens and/or wetlands with a high calcium carbonate level. No fens are found in the Middle River area. The nearest documented sightings are in a large fen over 60 air miles to the south.

Mead's Milkweed (*Asclepias meadii*): The only place on the Mark Twain National Forest where this glade dependant species is located is in the Bell Mountain Wilderness which is located over 50 air miles to the South.

Tumbling Creek cave snail (*Antrobia culveri*): This species is only known to occur in the Tumbling Creek Cave which is located over 100 air miles to the South on non Forest Service System lands.

Note: Because these species do not exist in, or have potential habitat in the Middle River area, they will not be evaluated any further in this document. A "No Effect" (NE) determination applies to all these species.

SPECIES EVALUATED

Only the **Bald Eagle, Gray bat, Indiana bat, Topeka shiner and the Running buffalo clover**, have potential habitat on the Cedar Creek portion of Houston/Rolla Ranger District or may occur in the Middle River Project Area. Therefore, only these will be fully evaluated.

A. BALD EAGLE – *Haliaeetus leucocephalus*

Species and habitat Information: The bald eagle is associated with aquatic environments (usually larger bodies of water such as lakes and large Rivers) throughout the majority of its range but will utilize upland areas when water is frozen. Fish is the primary prey item. They will also feed on other types of prey such as waterfowl, small mammals and have been observed feeding on carrion such as deer, especially in wintering areas. In Missouri, Bald eagles are usually present from November – March.

Nesting activities may begin as early as January with incubation and rearing of young occurring from March through mid-May. Nesting sites are usually in mature trees along shorelines, but they may use cliffs or rock outcrops where large trees are not available. Bald eagles generally utilize larger heavy branched trees within 100-600 feet of water for perch and/or roost sites. In Missouri most young fledge from June 1 to mid-July.

The previous use of DDT in the United States had a negative effect on the thickness of Bald eagle eggs and therefore their reproductive success. However the use of DDT has been banned for over a quarter of a century in the United States.

Since the Bald eagle was listed in 1978, populations have clearly increased in number and expanded in range throughout the United States. (Refer to pages 121 - 138 of the bald eagle section of the MTNF BA and pages 26-35 of the BO for additional information).

Survey Information:

Information from the Missouri Department of Conservation's Heritage Database was utilized in the preparation of this section.

The Mark Twain National Forest participates in Annual bald eagle winter counts. Information on the bald eagle's status and distribution in Missouri is found on pages 28 – 33 of the BO.

There are no documented active bald eagle nests on the Cedar Creek portion of the Mark Twain National Forest. No Bald eagles have been observed in the Middle River Project Area.

The Middle River project is located:

- Approximately 40 air miles Southeast from the nearest documented active nest site (This site is not located on National Forest System Lands).
- Approximately 70 air miles west of the nearest known communal roost.

Effects on the Bald eagle

Direct and Indirect Effects: No Bald eagles are known to occur in the Middle River Project Area. There are no large bodies of water in the Middle River Project Area which would attract Bald eagles. However, it is possible that they may pass through the area. Smoke from prescribed burns and other activities associated with implementing the Middle River project could result in the temporary displacement of individual birds.

Implementation of the Middle River project would not remove or kill any of the large potential perch and/or roost and/or nest trees preferred by the bald eagle in areas adjacent to Middle River. Watershed improvement projects would benefit the fish species in the area. The maintenance of openings would benefit the smaller mammals and ungulates that the Bald eagle also feeds on.

Herbicide use: *Note: Some limited use of herbicide is planned. All application rates and methods would follow the manufacturers and EPA guidelines.*

Page 125 and 126 of the Bald eagle section of the September 1998 Biological Assessment identify herbicide use and any effects on the Bald eagle.

Some limited application of Glyphosate (Roundup, Rodeo and Accord) would occur on the non-native Multi-flora Rose, which is a state listed noxious weed. Some limited application of Triclopyr (Garlon 3A and 4) would occur on approximately 60 acres to control Serecia lespedeza, which is a non-native invasive species.

In addition Glyphosphate would also be used to spot treat approximately 10 acres of old fescue fields. This would increase the hardwood seedlings survival in the thick fescue mat. All the applications would involve spot treatments only, there would be no aerial spraying.

Page 6 in the Introduction of the MTNF BA mentions the use of Glyphosate to help control noxious weeds. Glyphosate is a Foliar systemic herbicide (where the herbicide is absorbed through the plants top growth only). It is then readily absorbed and translocated within the plant itself. Glyphosate is degraded into carbon dioxide by soil microorganisms.

Glyphosphate would also be used to spot treat approximately acres of Fescue (a non native invasive species) to increase the success of native hardwood plantings.

Triclopyr is a very species specific and effects the growth hormones and causes uncontrolled growth in plants. At sufficient levels, the abnormal growth is so severe that vital functions cannot be maintained and the plant dies.

According to page 4-1 of the Triclopyr Risk Assessment “At application rates that are equal to or greater than those contemplated by the Forest Service, these studies suggest that effect on animal populations will be secondary to changes in vegetation and food supply and that these will either have no effect or will be beneficial to birds as well as mammals.”

According to page 4-24 and 4-25 of the Triclopyr Risk Assessment “At plausible levels of acute exposure in standing water and streams, 0.07-0.5 mg/L, Garlon 3A is not likely to have any effect on fish and aquatic invertebrates, and most algae. Some sensitive macrophytes could be affected. Currently information is only available on the Eurasian watermilfoil. This species is adversely affected if water concentrations remain above 0.25 ml/L for more than 24 hours. Such concentrations are not plausible in streams but could be maintained in small standing bodies of water.” There would be no effect on invertebrate abundance. *Note: No application of Triclopyr would occur over live or standing water.*

Page 126 and page 134 of the Bald eagle section in the September 1998 Biological Assessment state, that the ongoing activities with no effect include pesticide use (since no DDT is being utilized).

Page 13 of the BO states that on the Mark Twain National Forest “Herbicide use is restricted to noxious weed control, conversion of non-native fescue grass to native...”. Page 13, also states that “Glyphosate (Roundup, Rodeo, Accord) is used around buildings, for noxious weed control, ...”

Note: The Forest Plan BO does not identify or recognize herbicide use as having any direct or indirect effects on the Bald eagle.

Therefore, herbicide use would have no additional effects beyond those previously disclosed and addressed in the Forest Plan Biological Assessment and Biological Opinion.

Page 126 - 134 of the Bald eagle section of the September 1998 Biological Assessment identifies numerous types of activities that may have an effect on the Bald eagle (these are summarized on page 134). There are several categories of projects identified in Purpose and Need of the Middle River project that may have an Adverse Effect on the Bald eagle. These include Prescribed fire (Page 130, 132, Timber harvest and/or Tree removal (Page 126 - 130 and 133) and Road maintenance/Road /reconstruction (page 130-131).

1) Prescribed fire: Approximately 650 acres would be treated with prescribed fire to help maintain natural openings and enhance the ecosystem. Maintaining openings with prescribed fire would benefit the bald eagles alternative prey base. A Bald eagle may pass thru the area, therefore there is the possibility that smoke from a prescribed fires could result in Bald eagles temporarily leaving the area. Bald Eagles have been

observed staying on their nest during a prescribed burn (Personnel communication with Theresa Davidson 2003).

The effects of burning would be short lived and temporary for the following reasons: (1) Smoke dispersal would occur within 24 hours (may be as few as several hours in some cases) and (2) Burning has occurred in Missouri for centuries, this species has evolved with burning. The expected fire intensity is low enough that no potential roost and/or perch trees would be removed or damaged.

Prescribed fire would have no additional effects beyond those previously disclosed and addressed in the Forest Plan Biological Assessment and Biological Opinion.

2) Timber harvest and/or Tree removal: No existing potential perch trees or roost trees adjacent to Middle River would need to be removed. Over 90 percent of the Middle River corridor occurs on private lands.

There would be approximately 450 acres of timber removal in the Middle River area. The harvest method is uneven-age management (group selections) *Note: None of these activities would occur in the Forested Riparian corridor along the Middle River where any potential perch and/or roost and/or nest trees would likely occur.*

No timber harvest or tree removal would occur on approximately 200 acres that would be designated as Old Growth areas in the Middle River project.

Timber Harvest would have no additional effects beyond those previously disclosed and addressed in the Forest Plan Biological Assessment and Biological Opinion

3) Road maintenance/reconstruction: The maintenance of existing Forest Service system roads would occur. This would have a positive benefit for the areas watershed and fisheries (the Bald eagles primary food source) as compared to no road maintenance. The existing unimproved live water crossing on Forest Road 1686 would be improved, so that sediment would no longer enter the stream after each vehicle crossing.

Road maintenance/reconstruction would have no additional effects beyond those previously disclosed and addressed in the Forest Plan Biological Assessment.

ESA Cumulative Effects (50 CFR 402.02)

The cumulative effects spatial boundary of the Middle River Breaks portion of the Oak Hickory Hills LTA is being utilized. The cumulative effects temporal boundary of 10 years was selected because that is the life of the Middle River project. These boundaries were selected so that the cumulative effects information would be measurable and meaningful.

This includes fire suppression, prescribed fire, wildfire, various recreational activities, timber harvest, timber stand improvement, livestock grazing, farming operations, wildlife and fish habitat improvements, road construction and reconstruction and road closures. It also includes land clearing for farms and/or home sites and the use of chemicals.

Findings of MTNF BA / BO compliance

Effects of project activities have been determined by this analysis to be the same or less than the effects described in the MTNF BA (pg. 121 - 138) and BO (pg. 33 - 36). The MTNF BA project categories that may have a potential adverse effect are discussed in the Direct and Indirect effects section. There are no activities proposed in the Middle River Project that were not identified and/or discussed in the MTNF BA and BO. All the Reasonable and Prudent Measures (RPM) with their associated Terms and Conditions (TC) and the Conservation recommendations (CM) outlined (pg. 37 - 39) in the June 23, 1999 FWS Biological Opinion are being met.

Because all Middle River activities will comply with RPM's and TC's of the 6-23-99 BO, there will be no additional effects beyond those previously disclosed and addressed in the Forest Plan Biological Assessment and Biological Opinion.

Additional Resource Protection Measures

No additional Resource Protection Measures beyond the RPM/TC (BO page 37 - 39) are required to meet the Forest Plan and/or the BA/BO.

Conclusion/Determination:

The potential habitat for the Bald eagle would be maintained and/or improved as a result of the following activities.

(1) Implementation of the Middle River project would not remove or kill any of the potential large perch and/or roost and/or nest trees preferred by the bald eagle in areas adjacent to Middle River.

(2) Watershed improvement projects such as those identified below would benefit the fish species and riparian resource in the area.

A). Improving the existing live water stream crossing on Forest Road 1686 in order to reduce the amount of sediment entering the stream.

B.) Watershed and riparian area enhancements such as planting hardwoods (which would help to provide additional shade along the Middle River) would occur.

(3) The maintenance of openings would benefit the smaller mammals and ungulates that the bald eagle also feeds on.

(4) If a prescribed burn is occurring and a bald eagle passes thru the area, it could keep on moving.

The Bald eagle is not known to occur in the Middle River area. However, it may pass thru the Middle River area. None of the proposed projects actions would effect any potential Bald eagle habitat. **There is a “No Effect” (NE) determination for the Bald eagle and the Middle River project.**

B. GRAY BAT – *Myotis grisescens*

Species and habitat Information:

This medium size bat has grayish-brown fur. The gray bat's range is limited to the limestone karst areas of the southeastern and central United States.

The gray bat is primarily restricted to cave habitats and will rarely use other habitats. This species has very specific cave requirements; as a result, less than five percent of available caves are utilized. These requirements vary depending on time of year, age, and sex. Summer caves must be warm (55°-77° F), or with restricted rooms that can trap the body heat of roosting bats, and winter caves are very cold with a range in temperature between 42° and 52° F. These caves are deep with vertical walls and act as cold air traps. During transient period, gray bats may use transient caves that have less restrictive requirements than the summer and winter caves. In addition, males and yearling females will use a wider variety of caves and roost sites throughout the year. Summer caves are typically within 0.6 miles, rarely over 2.4 miles, of rivers and reservoirs that they forage over. Gray bats foraging areas are usually within 7 miles of their cave, but may forage up to 12 miles away where they feed on emergent aquatic insects. They have been known to travel nearly 30 miles in some instances (Personnel communication with Sybill Amelon. 2003)

Chlorinated hydrocarbon pesticides are a known factor in the decline of Gray bat populations. However, these pesticides have been banned since the late 1970's.

Gray bats breed at hibernation caves during September and October. Females will store the sperm over the winter and become pregnant after emerging in late March. A single offspring is born in late May or early June. *Note: Over 90 percent of the Gray bat caves in Missouri are not found on the Mark Twain National Forest.* (Refer to pages 141 - 159 of the Gray bat section of the MTNF BA and pages 16-20 of the BO for additional information on the Gray bat).

Survey Information:

Cave Research Foundation, Missouri Department of Conservation surveys and Forest Service surveys have been conducted across the forest and adjoining areas in the state of Missouri.

The Forest has conducted spring-fall mist netting at several locations during 1997, 1998, 1999, 2001 and 2002. Several Gray bats were captured in the Middle River Project Area along Middle River itself, during surveys conducted in 2003. One Gray bat was outfitted with a radio transmitter. The bat was tracked for 3 nights. It was only found on Forest Service lands during the first night (Personnel Communication with Sybill Amelon 2003).

The nearest known Gray bat cave is located immediately approximately 15 air miles west of the Middle River Project Area. Over 90 percent of the Gray bat caves in Missouri are not found on the Mark Twain National Forest.

The Missouri Heritage Database contains information on specific locations for threatened and endangered species, as well as common species. This information is compiled from field surveys and research conducted by the Missouri Department of Conservation, U.S. Forest Service, and other agencies. This database is continually being updated by the Missouri Department of Conservation. The information is summarized in the Geographical Information System (GIS) format. Information on the gray bat status and distribution in Missouri is found on pages 19 – 20 of the BO.

The Middle River project is located:

- Approximately 15 air miles west of the nearest known gray bat cave.

Effects on the Gray bat

Direct and Indirect Effects: One Gray bat was found in the Middle River project area in 2003. None of the proposed Middle River project would remove any trees in Riparian areas. Approximately 8 acres of hardwoods would be planted in riparian areas. Other Watershed improvement projects such as road closures of temporary and non-system roads, reducing erosion at an existing stream crossing and installing a erosion control structure would also occur. These projects would reduce sedimentation in the long term and improve the riparian habitat. Because Gray bats utilize Riparian corridors, these watershed type projects would benefit Gray bats. The intensity of the prescribed fires burn would be minimal, and thereby maintain any existing Gray bat habitat.

Herbicide use: Some limited use of herbicide is planned.

Note: All application rates and methods would follow the manufacturers and EPA guidelines. None of the Herbicides to be used contain DDE or heptachlor

compounds which have been implicated in the decline of Gray bats (MTNF BA pg. 147).

Some limited application of Glyphosate (Roundup, Rodeo and Accord) would occur on the non-native Multi-flora Rose, which is a state listed noxious weed. Some limited application of Triclopyr (Garlon 3A and 4) would occur on approximately 60 acres to control Serecia lespedeza, which is a non-native invasive species.

In addition Glyphosphate would also be used to spot treat approximately 10 acres of old fescue fields. This would increase the hardwood seedlings survival in the thick fescue mat. All the applications would involve spot treatments only, there would be no aerial spraying.

Page 6 in the Introduction of the MTNF BA mentions the use of Glyphosate to help control noxious weeds. Glyphosate is a Foliar systemic herbicide (where the herbicide is absorbed through the plants top growth only). It is then readily absorbed and translocated within the plant itself. Glyphosate is degraded into carbon dioxide by soil microorganisms.

Glyphosphate would also be used to spot treat approximately 40 acres of Fescue (a non native invasive species) to increase the success of native hardwood plantings.

Triclopyr is a very species specific and effects the growth hormones and causes uncontrolled growth in plants. At sufficient levels, the abnormal growth is so severe that vital functions cannot be maintained and the plant dies.

According to page 4-1 of the Triclopyr Risk Assessment "At application rates that are equal to or greater then those contemplated by the Forest Service, these studies suggest that effect on animal populations will be secondary to changes in vegetation and food supply and that these will either have no effect or will be beneficial to birds as well as mammals."

According to page 4-24 and 4-25 of the Triclopyr Risk Assessment "At plausible levels of acute exposure in standing water and streams, 0.07-0.5 mg/L, Garlon 3A is not likely to have any effect on fish and aquatic invertebrates, and most algae. Some sensitive macrophytes could be affected. Currently information is only available on the Eurasian watermilfoil. This species is adversely affected if water concentrations remain above 0.25 ml/L for more than 24 hours. Such concentrations are not plausible in streams but could be maintained in small standing bodies of water." There would be no effect on invertebrate abundance. *Note: No application of Triclopyr would occur over live or standing water.*

Page 146 in the Grey bat section in the September 1998 Biological Assessment state, that the ongoing activities with no impact include pesticide use.

Page 13 of the BO states that on the Mark Twain National Forest “Herbicide use is restricted to noxious weed control, conversion of non-native fescue grass to native...”. Page 13, also states that “Glyphosate (Roundup, Rodeo, Accord) is used around buildings, for noxious weed control, ...”

The BO does not identify or recognize herbicide use as having any direct or indirect effects on the Bald eagle.

Therefore, herbicide use would have no additional effects beyond those previously disclosed and addressed in the Forest Plan Biological Assessment and Biological Opinion.

The BO does not identify or recognize herbicide use as having any direct or indirect effects on the Gray bat.

Therefore, herbicide use would have no additional effects beyond those previously disclosed and addressed in the Forest Plan Biological Assessment and Biological Opinion.

Page 5 - 15 of the Gray bat section of the September 1998 Biological Assessment identifies numerous types of activities that may have a beneficial and/or adverse effect on the Gray bat (these are summarized on page 155). There are several categories of projects identified in Purpose and Need of the Middle River project that may have an Adverse Effect on the Gray bat. These include Prescribed fire (Page 152 - 153), Timber harvest and/or Tree removal (Page 148, 150 - 152), and Road maintenance/Road reconstruction (page 150 - 152).

1) Prescribed fire: Approximately 650 acres would be treated with prescribed fire to help maintain natural openings and savannas and enhance the ecosystem. Gray bats are not known to occur in the Middle River area. However, smoke from prescribed fires could result in Gray bats temporarily leaving the area. The expected fire intensity is low enough that existing water quality and riparian habitat would be retained.

The effects of burning would be short lived and temporary for the following reasons: (1) Smoke dispersal would occur within 24 hours (may be as few as several hours in some cases) and (2) Burning has occurred in Missouri for centuries, this species has evolved with burning.

Prescribed fire would have no additional effects beyond those previously disclosed and addressed in the Forest Plan Biological Assessment and Biological Opinion.

2) Timber harvest and/or Tree removal: There would be approximately 450 acres of timber removal in the Middle River area. The harvest method is uneven-age management (group selections)

None of these activities would occur in the Forested Riparian corridor along the Middle River. No timber harvest or tree removal would occur on approximately 200 acres that would be designated as Old Growth areas in the Middle River project.

Timber Harvest would have no additional effects beyond those previously disclosed and addressed in the Forest Plan Biological Assessment and Biological Opinion

3) Road maintenance/reconstruction: The maintenance of existing Forest Service system roads would occur. This would have a positive benefit for the areas watershed and fisheries as compared to no road maintenance. The existing unimproved live water crossing on Forest Road 1686 would be improved, so that sediment would no longer enter the stream after each vehicle crossing.

Road maintenance/reconstruction would have no additional effects beyond those previously disclosed and addressed in the Forest Plan Biological Assessment.

ESA Cumulative Effects (50 CFR 402.02)

The cumulative effects spatial boundary of the Middle River Breaks portion of the Oak Hickory Hills LTA is being utilized. The cumulative effects temporal boundary of 10 years was selected because that is the life of the Middle River Project. These boundaries were selected so that the cumulative effects information would be measurable and meaningful.

This includes fire suppression, prescribed fire, wildfire, various recreational activities, timber harvest, timber stand improvement, livestock grazing, wildlife and fish habitat improvements, road construction and reconstruction and road closures on private lands. It also includes land clearing for farms and/or home sites and housing construction and the use of chemicals on private land.

Findings of MTNF BA / BO compliance

Effects of project activities have been determined by this analysis to be the same or less than the effects described in the MTNF BA and BO. In addition there are no activities proposed in the Middle River Project that were not identified and/or discussed in the MTNF BA and BO. All the Reasonable and Prudent Measures (RPM) with their associated Terms and Conditions (TC) and the Conservation recommendations (CM) outlined (page 23 – 25) in the June 23, 1999 FWS Biological Opinion are being met. *See the Direct and Indirect section above for additional information.*

Because the Middle River Project activities will comply with RPM's and TC's of the 6-23-99 BO, there will be no additional effects beyond those previously

disclosed and addressed in the Forest Plan Biological Assessment and Biological Opinion.

Additional Resource Protection Measures

No additional Resource Protection Measures beyond the RPM/TC (BO page 23 - 25) are required to meet the Forest Plan and/or the MTNF BA/BO.

Conclusion/Determination:

The habitat for the Gray bat would be maintained and/or improved as a result of the following activities.

(1) Watershed improvement projects such as closing and revegetating some native surface roads that currently are sediment producers would reduce sedimentation in the area.

(2) Riparian area enhancements such as planting hardwoods, would help to maintain the riparian corridors that this species utilizes.

Overall any negative effects would be short lived and temporary. However, the long-term riparian habitat in the Middle River project would be improved. In addition there would be a reduction in sediment production in the area.

The Gray bat is known to occur in the Middle River Project Area. However, there are no known Gray bat caves within the Middle River Project Area. No timber harvest would occur in any Riparian areas. The long-term water quality and riparian habitat in the Middle River Project Area would be improved as a result of implementing the watershed improvement projects in this proposal. Overall any potential negative effects would be short lived and temporary.

Therefore there is a May Affect - Not Likely to Adversely Affect (NLAA) determination for the Gray bat and the Middle River project.

C. INDIANA BAT – *Myotis sodalis*

The Indiana bat is a medium size bat with a total length of 3 to 4 inches and a wingspan of 9.5 to 10.5 inches. The Indiana bat is found throughout the eastern half of the United States. In portions of their range in the United States, the Indiana bat populations have declined steadily and drastically since the 1980's. Indiana bats hibernate in caves and mines during the winter. These sites tend to have temperatures between 39° and 46° F and relative humidity above 74% and below saturation.

Summer habitats for Indiana bat are floodplain, riparian, and upland forest with trees that have ex-foliating bark for roosting. The Indiana bat will also use old fields and pastures with scattered trees for foraging habitats.

During the winter months Indiana bats hibernate in caves and abandoned mines. During the summer months Indiana bats are found predominately in forested areas near water. Female Indiana bats crawl under the peeling bark of large trees to have their young. Maternity roost sites are usually located in areas with 60 to 80% canopy cover (1999 U.S Fish Wildlife Service Biological Opinion 1999, page 42). Indiana bats forage in and around the tree canopy for flying insects. A 50-70% canopy closure is ideal for Indiana Bat foraging (MTNF BA, page 177). This is because the bats can move easier between the trees and that there is a greater habitat diversity compared to a mature canopy and therefore a greater abundance of insects.

Indiana bats have been declining recently due to human disturbance at their hibernating sites, loss of large trees with peeling bark that provide roosting sites, pesticide use and their naturally low birth rate. Indiana Bats utilize flood plains and riparian forests during the summer. Primary roosts are located in openings or the edge of forest stands (1999, U.S. Fish & Wildlife Service Biological Opinion for the Mark Twain National Forest).

The Indiana bat will use various tree species for roosting. Many trees don't have the proper characteristics for roost sites until they are dead or dying. However, species such as shagbark hickory and white oak are used while they are still living. Maternity roost sites are usually located in areas with 60 to 80% canopy cover.

Indiana bats forage in and around the tree canopy for flying insects. During the summer months, male Indiana bats normally forage within 1.2 miles of their hibernacula and during the fall this can increase to 1.8 to 4.2 miles.

Indiana bat's begin to swarm in August-September, and breeding usually occurs in the latter half of this time period. Females become pregnant after emerging the following spring. The young are born in late June or early July.

Refer to pages 161 - 166 of the Indiana bat section of the MTNF BA and pages 40 - 72 of the BO for additional information on the Indiana bat.

Survey Information:

Cave Research Foundation, Missouri Department of Conservation surveys and Forest Service surveys have been conducted across the forest and adjoining areas in the state of Missouri.

The Missouri Heritage Database contains information on specific locations for Threatened and Endangered species as well as common species. This information is

compiled from field surveys and research conducted by the Missouri Department of Conservation, U.S. Forest Service, and other agencies. This database is continually being updated by the Missouri Department of Conservation. The information is summarized in the Geographical Information System (GIS) format.

The Forest has conducted spring-fall mist netting at several locations during 1997, 1998, 1999, 2001 and 2002. No Indiana bats were caught in any of the above mist nettings. There are no documented Indiana bat sightings in the Middle River area. No Indiana bats were found during the 2003 bat surveys conducted in the Middle River Project Area (Personnel Communication with Sybill Amelon 2003).

Additional information on the Indiana bat status and distribution in Missouri is found on pages 161 - 164 of the MTNF BA and pages 48 – 62 of the BO.

The Middle River project is located:

- There are two caves documented to have Indiana bats over 14 air miles south and east of the Middle River Project Area. These caves do not occur on National Forest System lands.
- Approximately 70 air miles north west of the nearest capture site of a reproductive female Indiana bats. This capture site is located on lands owned by the State of Missouri.
- Approximately 70 air miles north of the nearest maternity colony.

Effects on the Indiana bat

Direct and Indirect Effects: There are no known Indian bat hibernacula in the Middle River Project Area. In addition the Middle River project would maintain roost trees, foraging habitat and potential fall swarming habitat.

The long-term indirect effect is that many of the existing White oak and Shagbark hickories (potential roost trees) would have increased growth rates because there would be less competition for light, water and nutrients from the surrounding trees. However, some potential roost trees may be lost as a result of logging. Uneven aged management would reduce the existing dense canopy closure and move it toward the 50-70% canopy closure that is ideal for Indiana Bat foraging. This benefit would diminish once those canopies grow together and the canopy closure again exceeds 70%.

The Middle River area is to be burned when the prevailing winds would not blow smoke (may result in the temporary displacement of individuals) west towards the nearest known Indiana bat caves. These effects would be short lived and temporary for the following reasons: (1) Smoke dispersal would occur within 24 hours (may be as few as several hours in some cases), and (2) Since burning has occurred in the Ozarks for centuries, this species has evolved with burning.

The intensity of the burn would be minimal. Therefore, no suitable roost trees are expected to be removed by fire. It is possible that some snags with slouching bark (potential roost trees) could be created. Burning may also reduce some of the dense understory in the area, which can inhibit movements by bats.

According to the FWS, the Indiana bat would benefit from prescribed burning. "...prescribed fires will provide some beneficial effects to the species by opening closed forest canopies, and by decreasing dense under story vegetation that can inhibit movements..." (pg. 63 of the June 23, 1999 FWS Biological Opinion).

Herbicide use: *Note: Some limited use of herbicide is planned. All application rates and methods would follow the manufacturers and EPA guidelines.*

Some limited application of Glyphosate (Roundup, Rodeo and Accord) would occur on the non-native Multi-flora Rose, which is a state listed noxious weed. Some limited application of Triclopyr (Garlon 3A and 4) would occur on approximately 60 acres to control *Serecia lespedeza*, which is a non-native invasive species.

In addition Glyphosphate would also be used to spot treat approximately 10 acres of old fescue fields. This would increase the hardwood seedlings survival in the thick fescue mat. All the applications would involve spot treatments only, there would be no aerial spraying.

In addition the proposed application of Glyphosate would meet the guidelines regarding the applications of pesticides and Indiana bat caves (LRMP IV – 51 and 52). Glyphosate is a Foliar systemic herbicide (where the herbicide is absorbed through the plants top growth only). It is then readily absorbed and translocated within the plant itself. Glyphosate is degraded into carbon dioxide by soil microorganisms

Page 6 in the Introduction of the MTNF BA mentions the use of Glyphosate to help control noxious weeds. Glyphosate is a Foliar systemic herbicide (where the herbicide is absorbed through the plants top growth only). It is then readily absorbed and translocated within the plant itself. Glyphosate is degraded into carbon dioxide by soil microorganisms.

Triclopyr is a very species specific and effects the growth hormones and causes uncontrolled growth in plants. At sufficient levels, the abnormal growth is so severe that vital functions cannot be maintained and the plant dies.

According to page 4-1 of the Triclopyr Risk Assessment "At application rates that are equal to or greater then those contemplated by the Forest Service, these studies suggest that effect on animal populations will be secondary to changes in vegetation

and food supply and that these will either have no effect or will be beneficial to birds as well as mammals.”

According to page 4-24 and 4-25 of the Triclopyr Risk Assessment “At plausible levels of acute exposure in standing water and streams, 0.07-0.5 mg/L, Garlon 3A is not likely to have any effect on fish and aquatic invertebrates, and most algae. Some sensitive macrophytes could be affected. Currently information is only available on the Eurasian watermilfoil. This species is adversely affected if water concentrations remain above 0.25 ml/L for more than 24 hours. Such concentrations are not plausible in streams but could be maintained in small standing bodies of water.” There would be no effect on invertebrate abundance. *Note: No application of Triclopyr would occur over live or standing water.*

Page 185, 188 and 191 of the Indiana bat section of the September 1998 Biological Assessment state that the ongoing activities with no effect include pesticide use.

Page 188 of the Indiana bat section of the September 1998 Biological Assessment states “None of the pesticides implicated in bat declines would be used on the Mark Twain National Forest.”

Page 13 of the BO states that on the Mark Twain National Forest “Herbicide use is restricted to noxious weed control, conversion of non-native fescue grass to native...”. Page 13 also states that “Glyphosate (Roundup, Rodeo, Accord) is used around buildings, for noxious weed control, ...”

The BO does not identify or recognize any herbicide that could be used on the Mark Twain National Forest as having any direct effect on the Indiana bat (BO page 65).

Therefore, herbicide use would have no additional effects beyond those previously disclosed and addressed in the Forest Plan Biological Assessment and Biological Opinion.

Page 179 - 194 of the Indiana Bat section of the September 1998 Biological Assessment identifies numerous types of activities that may have a beneficial and/or adverse effect on the Indiana bat (these are summarized on page 191). There are several categories of projects identified in Purpose and Need of the Middle River project that may have an Adverse Effect on the Indiana bat. These include Prescribed fire (Page 189, 191) and, Timber harvest and/or Tree removal (Page 179 - 180, 190).

1) Prescribed fire: Approximately 650 acres would be treated with prescribed fire to help maintain natural openings and enhance the ecosystem. However, smoke from prescribed fires could result in Indiana bats temporarily leaving the area (see the Resource Protection Measures below, which address this concern). Because the expected fire intensity would be minimal, no suitable roost trees would be removed by fire. It is possible that some snags with sloughing bark (potential roost trees) would be created. Prescribed fire would also help reduce the dense understory vegetation that can inhibit movements by bats.

According to the FWS, the Indiana bat would benefit from prescribed burning. "... prescribed fires will provide some beneficial effects to the species by opening closed forest canopies, and by decreasing dense under story vegetation that can inhibit movements..." (pg. 63 of the June 23, 1999 FWS Biological Opinion).

Prescribed fire would have no additional effects beyond those previously disclosed and addressed in the Forest Plan Biological Assessment and Biological Opinion.

2) Timber harvest and/or Tree removal: The Middle River project is over 10 air miles from the nearest known Indiana Bat Cave. There is a very slight potential that Indiana bats may occasionally utilize the area.

There would be approximately 450 acres of timber removal in the Middle River area. The harvest method is uneven-age management (group selections). These various treatments would result in a mosaic of different habitats. However, there is a possibility that some potential roost trees may be removed. In some locations timber removal would help reduce the existing dense canopy that can inhibit bat movements. "...that most roosts were located in areas that had a canopy closure of 60 to 80." (pg. 42 of the June 23, 1999 FWS Biological Opinion).

No timber harvest or tree removal would occur on approximately 200 acres that would be designated as Old Growth areas in the Middle River project. None of these activities would occur in the Forested Riparian corridor along the Middle River.

Timber Harvest would have no additional effects beyond those previously disclosed and addressed in the Forest Plan Biological Assessment and Biological Opinion.

ESA Cumulative Effects (50 CFR 402.02):

The cumulative effects spatial boundary of the Middle River Breaks portion of the Oak Hickory Hills LTA is being utilized. The cumulative effects temporal boundary of 10 years was selected because that is the life of the Middle River project. These boundaries were selected so that the cumulative effects information would be measurable and meaningful.

This includes fire suppression, prescribed fire, wildfire, various recreational activities, timber harvest, timber stand improvement, livestock grazing, wildlife and fish habitat improvements, road construction and reconstruction and road closures on private lands. It also includes land clearing for farms and/or home sites and housing construction and the use of chemicals on private land.

Findings of MTNF BA / BO compliance

Effects of project activities have been determined by this analysis to be the same or less than the effects described in the MTNF BA and BO. In addition there are no activities proposed in the Middle River Project that were not identified and/or discussed in the MTNF BA and BO. All the Reasonable and Prudent Measures (RPM) with their associated Terms and Conditions (TC) and the Conservation recommendations (CM) outlined (pg. 75 - 82) in the June 23, 1999 FWS Biological Opinion are being met. This includes the TC which were developed specifically for the Cedar Creek Ranger District (BO pg. 78) *See the Direct and Indirect section above for additional information.*

Because the Middle River Project activities will comply with RPM's and TC's of the 6-23-99 BO, there will be no additional effects beyond those previously disclosed and addressed in the Forest Plan Biological Assessment and Biological Opinion.

Additional Resource Protection Measures

No additional Resource Protection Measures beyond the RPM/TC (BO page 76 - 81) are required to meet the Forest Plan and/or the MTNF BA/BO.

Conclusion/Determination:

The habitat for the Indiana bat would be maintained and/or improved as a result of the following activities which would retain at least 23 roost trees per acre.

- 1) Implementation of the Middle River project would not remove any live potential roost trees $\geq 26''$ dbh. Unless they are an immediate safety hazard *
- 2) Implementation of the Middle River project would not remove any dead potential roost trees $\geq 20''$ dbh. Unless they are an immediate safety hazard *
- 3) Implementation of the Middle River project would retain all the shagbark hickory, shellbark hickory, and lightning struck trees $\geq 9''$ dbh within harvest units. It would also retain some (not all) dead and dying trees $\geq 9''$ dbh with at least 10% exfoliating or defoliating bark within harvest units. *
- 4) Approximately 200 acres of Old Growth areas would be designated in the Middle River project. *
- 5) Prescribed burning and/or Uneven aged silvicultural treatments would help to provide the 60 – 80 % canopy closure for ideal roosting sites.
- 6) Prescribed burning and/or Uneven aged silvicultural treatments would help to reduce the dense canopies in areas thereby allowing for better movement of Indian bats in the area.

7) Watershed and riparian area enhancements such as planting hardwoods and reconstructing the existing unimproved live water crossing on Forest Road 1686 would improve the water quality in the Middle River area. Thereby benefiting potential Indiana bat habitat.

* These would provide and retain potential Indiana bat roost sites

Note: The FWS would have the opportunity to review the Burn Plans 30 days prior to any planned ignition if they desire.

The Indiana bat is not known to occur in the Middle River Project Area. In addition the Middle River Project activities will comply with RPM's and TC's of the 6-23-99 BO. All proposed activities would maintain and/or improve any potential Indiana bat habitat. **Therefore there is a May Affect - Not Likely to Adversely Affect (NLAA) determination for the Indiana bat and the Middle River project.**

D. Topeka shiner – *Notropis Topeka*

Species and habitat Information:

The Topeka shiner prefers undisturbed small prairie headwater streams. The adults are usually under 3 inches long. It can tolerate a wide range of temperature fluctuations (near freezing to 90 degree Fahrenheit). It breeds from May to mid-July. However, it has been found in canals and ditches.

There are several impacts that may be detrimental to the Topeka shiner and the headwater streams where it is found. This includes impoundments on the headwater streams. These impoundments may result in the introduction of predatory species such as the largemouth bass and they alter the hydrology of headwater pools that can fill in with gravel and leaves more rapidly. Other concerns include: channelization, sediment and agricultural activities such as grazing and fertilizing fields that can result in additional eutrophication in the areas waters (page 110 of the Topeka shiner section of the 1998 MTNF BA).

The surrounding private land consists mainly of agricultural land and scattered houses. The watershed has been impacted by the activities on private lands. Over 95% of the Middle River watershed occurs on non Forest Service System lands.

(Refer to pages 107 - 120 of the Topeka shiner section of the MTNF BA for additional information).

Survey Information:

Information from the Missouri Department of Conservation's Heritage Database was utilized in the preparation of this section.

There was one documented Topeka shiner sighting, approximately 1½ air miles north of the Project Area along Middle River in the early 1961. There have been no other documented Topeka Shiner sightings since then. (Page 108 MTNF BA). Additional surveys by the Missouri Department of Conservation in 1994 and 1995 of the same location (site 0869) did not find any Topeka shiners.

The Middle River project is located:

- Approximately 1 ½ air miles from the last Topeka Shiner sighting (1962) in the Middle River drainage.
- Approximately 5 air miles from Cedar Creek where the nearest recent Topeka shiner sighting occurred. Middle River does not drain into Cedar Creek or any Topeka shiner habitat.

Effects on the Topeka shiner

Direct and Indirect Effects: Because the Middle River Project Area does not contain or drain into any Topeka shiner habitat there would be no direct effect on any Topeka shiners. However, potential impacts to water quality will still be addressed.

Page 115 - 118 of the Topeka shiner section of the September 1998 Biological Assessment identifies numerous types of activities that may have a beneficial and/or adverse effect on the Topeka shiner (these are summarized on page 118). There are several categories of projects identified in Purpose and Need of the Middle River project that may have an Adverse Effect on the Topeka shiner. These include herbicide use (Page 117), Livestock grazing (Page 116), Timber harvest (Page 116, 117), Road Reconstruction (page 117) and Prescribed burning (Page 116).

1) Herbicide use: *Note: Some limited use of herbicide is planned. All application rates and methods would follow the manufacturers and EPA guidelines.*

Some limited application of Glyphosate (Roundup, Rodeo and Accord) would occur on the non-native Multi-flora Rose, which is a state listed noxious weed. Some limited application of Triclopyr (Garlon 3A and 4) would occur on approximately 60 acres to control *Serecia lespedeza*, which is a non-native invasive species.

In addition Glyphosphate would also be used to spot treat approximately 10 acres of old fescue fields. This would increase the hardwood seedlings survival in the thick fescue mat. All the applications would involve spot treatments only, there would be no aerial spraying.

Page 6 in the Introduction of the MTNF BA mentions the use of Glyphosate to help control noxious weeds. Glyphosate is a Foliar systemic herbicide (where the

herbicide is absorbed through the plants top growth only). It is then readily absorbed and translocated within the plant itself. Glyphosate is degraded into carbon dioxide by soil microorganisms.

Glyphosphate would also be used to spot treat approximately 40 acres of Fescue (a non native invasive species) to increase the success of native hardwood plantings.

Triclopyr is a very species specific and effects the growth hormones and causes uncontrolled growth in plants. At sufficient levels, the abnormal growth is so severe that vital functions cannot be maintained and the plant dies.

According to page 4-1 of the Triclopyr Risk Assessment “At application rates that are equal to or greater then those contemplated by the Forest Service, these studies suggest that effect on animal populations will be secondary to changes in vegetation and food supply and that these will either have no effect or will be beneficial to birds as well as mammals.”

According to page 4-24 and 4-25 of the Triclopyr Risk Assessment “At plausible levels of acute exposure in standing water and streams, 0.07-0.5 mg/L, Garlon 3A is not likely to have any effect on fish and aquatic invertebrates, and most algae. Some sensitive macrophytes could be affected. Currently information is only available on the Eurasian watermilfoil. This species is adversely affected if water concentrations remain above 0.25 ml/L for more than 24 hours. Such concentrations are not plausible in streams but could be maintained in small standing bodies of water.” There would be no effect on invertebrate abundance. *Note: No application of Triclopyr would occur over live or standing water.*

Page 117 of the Topeka shiner section in the September 1998 Biological Assessment states that adverse impacts may occur if “use of fertilizers or pesticides inconsistent with approved labeling and application procedures...” *The herbicides to be used are registered with the EPA and would applied via approved application methods and only used as labeled.*

Page 13 of the BO states that on the Mark Twain National Forest “Herbicide use is restricted to noxious weed control, conversion of non-native fescue grass to native...”. Page 13, also states that “Glyphosate (Roundup, Rodeo, Accord) is used around buildings, for noxious weed control, ...”

Page 117 of the MTNF BA states “Aerial application is not permitted...” *No aerial application of herbicides would occur.*

Herbicide use would have no additional effects beyond those previously disclosed and addressed in the Forest Plan Biological Assessment. No Topeka shiner, exist in the Middle River Project Area or the entire Middle River drainage. *Since the Middle River Project Area does not occur in or drain into any Topeka shiner habitat, there would be no effect on the Topeka shiner as a result of utilizing herbicides.*

2) Grazing: There would be approximately 440 acres of grazing in the Middle River Project Area. No grazing would occur in Riparian areas.

On the Mark Twain National Forest Grazing systems are designed to "... manipulate openland vegetation for the achievement of overall management area objectives. The range resource will be managed to the degree that it compliments, or does not detract from, other management area objectives". LRMP IV-24. These guidelines minimize the potential for excessive grazing (particularly in floodplains) which can be detrimental to this species.

Grazing would have no additional effects beyond those previously disclosed and addressed in the Forest Plan Biological Assessment. *Since the Middle River Project Area does not occur in or drain into any Topeka shiner habitat, there would be no effect on the Topeka shiner as a result of utilizing grazing.*

3) Timber harvest and/or Tree removal: There would be approximately 450 acres of timber removal in the Middle River area. The harvest method is uneven-age management (group selections) *Note: None of these activities would occur in the Forested Riparian corridor along the Middle River.*

No timber harvest or tree removal would occur on approximately 200 acres that would be designated as Old Growth areas in the Middle River project. Timber harvest would have no additional effects beyond those previously disclosed and addressed in the Forest Plan Biological Assessment. *Since the Middle River Project Area does not occur in or drain into any Topeka shiner habitat, there would be no effect on the Topeka shiner as a result of Timber harvest.*

4) Prescribed fire: Approximately 650 acres would be treated with prescribed fire to help maintain natural openings and enhance the ecosystem. The expected fire intensity is low. No dozer lines would be constructed in riparian areas or on steep slopes. In addition, burning has occurred in Missouri for centuries, this species has evolved with burning.

Prescribed fire would have no additional effects beyond those previously disclosed and addressed in the Forest Plan Biological Assessment. *Since the Middle River Project Area does not occur in or drain into any Topeka shiner habitat, there would be no effect on the Topeka shiner as a result of Prescribed fire.*

5) Road maintenance/reconstruction: The maintenance of existing Forest Service system roads would occur. This would have a positive benefit for the areas watershed and fisheries as compared to no road maintenance. The existing unimproved live water crossing on Forest Road 1686 would be improved, so that sediment would no longer enter the stream after each vehicle crossing.

Road maintenance/reconstruction would have no additional effects beyond those previously disclosed and addressed in the Forest Plan BA. *Since the Middle River Project Area does not occur in or drain into any Topeka shiner habitat, there would be no effect on the Topeka shiner as a result of Road maintenance/reconstruction.*

ESA Cumulative Effects (50 CFR 402.02)

The cumulative effects spatial boundary for the Topeka shiner is the Middle River watershed. The cumulative effects temporal boundary of 10 years for the Topeka shiner was selected because all the items in the Middle River project would be implemented in the next 10 years. These boundaries were selected so that the cumulative effects information would be measurable and meaningful.

There are no direct, indirect effects on the Topeka shiner. In addition, the cumulative effects boundary for the Middle River Project Area does not occur in or drain into any Topeka shiner habitat. Therefore, there would be no cumulative effect on the Topeka shiner.

Findings of MTNF BA / BO compliance

Effects of project activities have been determined by this analysis to be the same or less than the effects described in the MTNF BA (pg. 107 – 120). *Note: This species was not addressed in the BO.* The MTNF BA project categories that may have a potential adverse effect are discussed in the Direct and Indirect effects section. In addition there are no activities proposed in the Middle River Project that were not identified and/or discussed in the MTNF BA.

Because all the proposed activities in Middle River are covered in the MTNF BA (page 107 - 120), there will be no additional effects beyond those previously disclosed and addressed in the Forest Plan Biological Assessment.

Additional Resource Protection Measures

No new or additional Resource Protection Measures beyond the Forest Plan Standards and Guidelines (MTNF BA page 111 – 115) are required.

Conclusion/Determination:

The water quality in Middle River would be maintained and/or improved as a result of the following activities.

- 1). Improving the existing live water stream crossing (of a small tributary to Middle River) on Forest Road 1686 in order to reduce the amount of sediment entering the stream.
- 2.) Watershed and riparian area enhancements such as planting hardwoods (which would help to provide additional shade along the Middle River) would occur.

There are no Topeka shiners in the Middle River Project Area, in the Middle River watershed and the Middle River watershed does not drain into any Topeka shiner habitat. **Therefore there is a “No Effect” (NE) determination for the Topeka Shiner and the Middle River project.**

E. Running buffalo clover – *Trifolium stooniferum*

Species and habitat Information:

Running buffalo clover is a disturbance loving perennial plant that flowers in mid-April through June and fruits from May to July. Prior to 1994, the last sighting of the Running buffalo clover was in 1907 (page 55 MNTF BA)

The reasons for the plants decline in Missouri are unclear. “It may have depended on large herbivores (bison and elk) to periodically disturb areas and create habitat, as well as disperse seeds. As Bison and elk were eliminated, vital habitat and means of seed dispersal were lost page” (page 55 MTNF BA). “... a clover that was once widespread in the eastern half of the United States, which became nearly extinct, perhaps following the decimation of the North American Bison herds (*Trifolium stoloniferum*, running buffalo clover).” (Yatskievych 1999)

If there is not some type of disturbance, disturbance-dependant species will disappear due to a loss of habitat. (USDI – *Trifolium stoloniferum* Recovery Plan 1989)

“On the Mark Twain National Forest, the most probable limiting factors for Running buffalo clover are loss of open woodlands as forest have grown more dense in the past several decades, and loss of periodic fire” (page 56 MTNF BA).

(Refer to pages 55 - 63 of the Running buffalo clover section of the MTNF BA for additional information).

Survey Information:

Information from the Missouri Department of Conservations Heritage Database was utilized in the preparation of this section.

There are no documented sightings of any Running Buffalo Clover in the Middle River Project Area. There were several introductions in Callaway County in the early 1990’s of the Running buffalo clover approximately 5 air miles to the North. Many of these died from a virus infection (Hickey 1994). None of the surviving plants had any flowers in 1997 (Hickey 1997).

The Middle River project is located:

- Approximately 5 air miles from the nearest introduced Running buffalo clover plants.

Effects on the Running Buffalo Clover

Direct and Indirect Effects: The Middle River project does not contain any known Running buffalo clover plants. However, some of the activities proposed in Middle River may have an indirect effect this species by benefiting its habitat.

Page 60 – 61 of the Running buffalo clover section of the September 1998 Biological Assessment identifies numerous types of activities that may have a beneficial and/or adverse effect on the Running buffalo clover (these are summarized on page 61). The categories of projects identified in Purpose and Need of the Middle River project that may have an Effect on the Running buffalo clover is Herbicide use (Page 61), livestock grazing (Page 60) and prescribed fire (Page 60).

1) Herbicide use: *Note: Some limited use of herbicide is planned. All application rates and methods would follow the manufacturers and EPA guidelines.*

Some limited application of Glyphosate (Roundup, Rodeo and Accord) would occur on the non-native Multi-flora Rose, which is a state listed noxious weed. Some limited application of Triclopyr (Garlon 3A and 4) would occur on approximately 60 acres to control *Serecia lespedeza*, which is a non-native invasive species.

In addition Glyphosphate would also be used to spot treat approximately 10 acres of old fescue fields. This would increase the hardwood seedlings survival in the thick fescue mat. All the applications would involve spot treatments only, there would be no aerial spraying.

Glyphosphate would also be used to spot treat approximately 40 acres of Fescue (a non native invasive species) to increase the success of native hardwood plantings.

Triclopyr is a very species specific and effects the growth hormones and causes uncontrolled growth in plants. At sufficient levels, the abnormal growth is so severe that vital functions cannot be maintained and the plant dies.

According to page 4-1 of the Triclopyr Risk Assessment “At application rates that are equal to or greater than those contemplated by the Forest Service, these studies suggest that effect on animal populations will be secondary to changes in vegetation and food supply and that these will either have no effect or will be beneficial to birds as well as mammals.”

Page 6 in the Introduction of the MTNF BA mentions the use of Glyphosate to help control noxious weeds. Glyphosate is a Foliar systemic herbicide (where the herbicide is absorbed through the plants top growth only). It is then readily absorbed and translocated within the plant itself. Glyphosate is degraded into carbon dioxide by soil microorganisms.

Page 13 of the BO states that on the Mark Twain National Forest “Herbicide use is restricted to noxious weed control, conversion of non-native fescue grass to native...”. Page 13, also states that “Glyphosate (Roundup, Rodeo, Accord) is used around buildings, for noxious weed control, ...”

Page 61 of the MTNF BA states “Aerial application is not permitted...” and “The potential for herbicides to drift onto potential running buffalo clover sites is extremely low....” The nearest known location of Running buffalo clover plants (a introduced population) is approximately 5 air miles to the North.

Herbicide use would have no additional effects beyond those previously disclosed and addressed in the Forest Plan Biological Assessment. *Because the distance to the nearest plants are over 5 air miles, there would be no direct effect on the Running buffalo clover itself as a result of utilizing herbicides. However, there would be the indirect effect of benefiting Running buffalo clover habitat by controlling invasive weeds.*

2) Grazing: There would be approximately 440 acres of grazing in the Middle River Project Area. No grazing would occur in Riparian areas.

On the Mark Twain National Forest Grazing systems are designed to “... manipulate openland vegetation for the achievement of overall management area objectives. The range resource will be managed to the degree that it compliments, or does not detract from, other management area objectives”. LRMP IV-24. These guidelines minimize the potential for excessive grazing which can be detrimental to this species.

Light and moderate livestock grazing can be beneficial to the Running Buffalo clover (Page 61 MTNF BA).

Grazing would have no additional effects beyond those previously disclosed and addressed in the Forest Plan Biological Assessment. *There would be no direct effect on the Running buffalo clover itself as a result of utilizing grazing. However, there would be the indirect effect of benefiting potential Buffalo clover habitat.*

3) Prescribed fire: Approximately 650 acres would be treated with prescribed fire to help maintain natural openings and enhance the ecosystem. The expected fire intensity is low. No dozer lines would be constructed in riparian areas or on steep slopes. In addition, burning has occurred in Missouri for centuries, this species has evolved with burning. Prescribed burning would help to maintain the habitat conditions favorable for the Running buffalo clover.

Prescribed fire would have no additional effects beyond those previously disclosed and addressed in the Forest Plan Biological Assessment. *There would be no direct effect on the Running buffalo clover as a result of Prescribed fire. However, there would be the indirect effect of benefiting Running buffalo clover habitat.*

ESA Cumulative Effects (50 CFR 402.02)

The cumulative effects spatial boundary of the Middle River Breaks portion of the Oak Hickory Hills LTA is being utilized. The cumulative effects temporal boundary of 10 years was selected because that is the life of the Middle River project. These boundaries were selected so that the cumulative effects information would be measurable and meaningful.

There are no direct, indirect effects on the Running buffalo clover. In addition the introduced plantings of Running buffalo clover do not occur within the above cumulative effects boundary. Therefore, there would be no cumulative effect on the Running buffalo clover.

Findings of MTNF BA compliance

Effects of project activities have been determined by this analysis to be the same or less than the effects described in the MTNF BA (pg. 55 – 63). *Note: The Running Buffalo clover was not covered in the June 1999 BO.* The MTNF BA project categories that may have a potential adverse effect are discussed in the Direct and Indirect effects section. In addition there are no activities proposed in the Middle River Project that were not identified and/or discussed in the MTNF BA. *See the Direct and Indirect section above for additional information.* **Because all the proposed activities in Middle River are covered in the BA (page 55 – 63), there will be no additional effects beyond those previously disclosed and addressed in the Forest Plan Biological Assessment.**

Additional Resource Protection Measures

No additional Resource Protection Measures are required beyond the Forest Plan standards and guidelines (MTNF BA page 57 – 59).

Conclusion/Determination:

“Management through prescribed fire, light grazing, control of exotic species and/or selective timber harvest may be used to improve the habitat conditions...” (Page 60, MTNF BA).

The potential habitat for the Running buffalo clover would be maintained and/or improved as a result of the following activities.

- (1) Open areas would be maintained utilizing several methods (including prescribed burning and/or grazing).
- (2) Un-even aged timber harvest would also open up some dense forest.
- (3) Exotic species would be controlled by mowing and/or the use of herbicides.

The Running buffalo clover is not known to occur in the Middle River area. However potential habitat would be maintained as a result of implementing the Middle River project. **Therefore there is a “No Effect” (NE) determination for the Running buffalo clover and the Middle River project.**

SIGNATURE

Klaus Leidenfrost
Houston/Rolla/Cedar Creek
District Wildlife Biologist

Date

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